WHAT IS CLAIMED IS

1. A wafer processing apparatus for processing a wafer by dipping the wafer into a processing solution, comprising:

a wafer processing bath;

a holding portion for directly or indirectly holding the wafer; and

a driving portion for supporting said holding portion from above said processing bath to swing said holding portion within said processing bath.

2. The apparatus according to claim 1, wherein said driving portion also serves as a convey mechanism for conveying the wafer between the apparatus and another apparatus.

3. The apparatus according to claim 1, further comprising ultrasonic generating means for generating ultrasonic waves in said processing bath.

4. The apparatus according to claim 1, further comprising a swing support member that comes into contact with a peripheral portion of the wafer in swinging the wafer by said driving portion, thereby supporting swinging by said driving portion.

5. The apparatus according to claim 4, wherein a portion of said swing support member which may come into contact with the peripheral portion of the wafer is rounded.

6. The apparatus according to claim 4, wherein a portion of said swing support member which may come into contact with the peripheral portion of the wafer has a groove in a direction substantially parallel to a wafer surface.

7. The apparatus according to claim 6, wherein the groove has a V shape.

8. The apparatus according to claim 6, wherein the groove has a rectified full-wave shape.

9. The apparatus according to claim 1, wherein said processing bath comprises a circulating mechanism including an overflow bath.

10. The apparatus according to claim 4, wherein said driving portion swings said holding portion to rotate the wafer when the peripheral portion of the wafer comes into contact with said swing support member.

11. The apparatus according to claim 3, wherein said ultrasonic generating means comprises an ultrasonic bath, an ultrasonic source, and an adjusting mechanism for adjusting a position of said ultrasonic source in said ultrasonic bath, and ultrasonic waves are transmitted to said processing bath via an ultrasonic transmitting medium placed in said ultrasonic bath.

12. The apparatus according to claim 1, wherein said driving portion comprises a first driving portion for horizontally driving said holding portion, and a second

driving portion for vertically driving said holding portion.

13. The apparatus according to claim 1, wherein said holding portion holds the wafer substantially perpendicular to a bottom surface of said processing bath, and said driving portion swings the wafer within a plane substantially perpendicular to the bottom surface of said processing bath.

14. The apparatus according to claim 1, wherein said driving portion swings said holding portion within said processing bath to substantially uniformly process the wafer with a processing solution.

15. The apparatus according to claim 1, wherein said holding portion can hold a wafer holder capable of storing a plurality of wafers.

16. The apparatus according to claim 1, wherein at least portions of said processing bath, said holding portion, and said driving portion, which may come into contact with a processing solution, are made of a material selected from the group consisting of quartz and plastic.

17. The apparatus according to claim 1, characterized in that at least portions of said processing bath, said holding portion, and said driving portion, which may come into contact with a processing solution, are made of a material selected from the group consisting of a

fluorine resin, vinyl chloride, polyethylene, polypropylene, polybutyleneterephthalate (PBT), and polyetheretherketone (PEEK).

18. A wafer convey apparatus for conveying a wafer, comprising:

a holding portion for directly or indirectly holding the wafer; and

a driving portion for driving said holding portion along a convey path,

said driving portion dipping the wafer into a wafer processing bath and swinging the wafer midway along the convey path.

19. The apparatus according to claim 18, wherein said driving portion comprises a first driving portion for horizontally driving said holding portion, and a second driving portion for vertically driving said holding portion.

20. The apparatus according to claim 18, wherein said holding portion holds the wafer substantially perpendicular to a bottom surface of said processing bath, and said driving portion swings the wafer within a plane substantially perpendicular to the bottom surface of said processing bath.

21. The apparatus according to claim 18, wherein said driving portion swings said holding portion within said processing bath to substantially uniformly process the

wafer with a processing solution in said processing bath.

22. The apparatus according to claim 18, wherein said driving portion swings said holding portion within said processing bath to enhance swinging of the wafer when a peripheral portion of the wafer comes into contact with a projection formed in said processing bath.

23. The apparatus according to claim 18, wherein said driving portion swings said holding portion within said processing bath to rotate the wafer when a peripheral portion of the wafer comes into contact with a projection formed in said processing bath.

24. The apparatus according to claim 18, wherein said holding portion can hold a wafer holder capable of storing a plurality of wafers.

25. A semiconductor fabrication apparatus comprising the apparatus according to claim 18, and one or a plurality of wafer processing apparatuses.

26. A wafer processing method of processing a wafer by dipping the wafer into a processing solution, comprising dipping a wafer into the processing solution while supporting the wafer from above a wafer processing bath, and swinging the wafer within said processing bath.

27. The method according to claim 26, wherein, while the wafer is swung within said processing bath, ultrasonic waves are generated in the processing solution.

28. The method according to claim 26, wherein, when the wafer is swung within said processing bath, a peripheral portion of the wafer is brought into contact with a projection formed in said processing bath to enhance swinging of the wafer.

29. The method according to claim 26, wherein, when the wafer is swung within said processing bath, a peripheral portion of the wafer is brought into contact with a projection formed in said processing bath to rotate the wafer.

30. The method according to claim 26, wherein the wafer is swung to substantially uniformly process the wafer with the processing solution.

31. The method according to claim 26, wherein the wafer is etched by using an etching solution as the processing solution.

32. The method according to claim 26, wherein a wafer having a porous silicon layer is etched by using an etching solution as the processing solution.

33. A semiconductor substrate fabrication method comprising fabricating a semiconductor substrate by using the method according to claim 32 in a part of fabrication steps.

34. A wafer processing method comprising processing a wafer by using the apparatus according to claim 1.

35. A wafer processing method comprising etching a

specific layer formed on a wafer by using the apparatus according to claim 1.

36. A semiconductor substrate fabrication method comprising fabricating a semiconductor substrate by using the method according to claim 35 in a part of fabrication steps.

37. A wafer processing method of processing a wafer while supplying ultrasonic waves, comprising:

completely dipping the wafer into a processing solution, and processing the wafer while changing a strength of ultrasonic waves which act on the wafer.

38. A wafer processing method of processing a wafer while supplying ultrasonic waves, comprising:

completely dipping the wafer into a processing solution, and processing the wafer while moving the wafer.

39. A wafer processing method of processing a wafer while supplying ultrasonic waves, comprising:

completely dipping the wafer in a processing solution, and processing the wafer while swinging the wafer.

40. A wafer processing method of processing a wafer while supplying ultrasonic waves, comprising:

completely dipping the wafer in a processing solution, and processing the wafer while swinging the wafer to cross a plane of vibration of ultrasonic waves.

41. A wafer processing method of processing a wafer while supplying ultrasonic waves, comprising:

completely dipping the wafer in a processing solution, supporting the wafer substantially perpendicular to a plane of vibration of ultrasonic waves, and processing the wafer while swinging the wafer to cross the plane of vibration of ultrasonic waves.

42. A wafer processing method of processing a wafer while supplying ultrasonic waves, comprising:

completely dipping the wafer in a processing solution, supporting the wafer substantially parallel to a plane of vibration of ultrasonic waves, and processing the wafer while swinging the wafer to cross the plane of vibration of ultrasonic waves.

43. A semiconductor substrate fabrication method comprising:

the step of forming an unporous layer on a porous layer formed on a surface of a first substrate;

the step of adhering a first substrate side of a prospective structure and a second substrate prepared separately to sandwich said unporous layer between the first substrate side and said second substrate;

the removal step of removing said first substrate from the adhered structure to expose said porous layer on a second substrate side thereof; and

the etching step of etching said porous layer while

the second substrate side on which said porous layer is exposed is completely dipped into an etching solution, and ultrasonic waves are supplied, thereby exposing a surface of the second substrate side,

the etching step changing a strength of ultrasonic waves which act on the second substrate side.

44. A semiconductor substrate fabrication method comprising:

the step of forming an unporous layer on a porous layer formed on a surface of a first substrate;

the step of adhering a first substrate side of a prospective structure and a second substrate prepared separately to sandwich said unporous layer between the first substrate side and said second substrate;

the removal step of removing said first substrate from the adhered structure to expose said porous layer on a second substrate side thereof; and

the etching step of etching said porous layer while the second substrate side on which said porous layer is exposed is completely dipped into an etching solution, and ultrasonic waves are supplied, thereby exposing a surface of the second substrate side,

the etching step moving the second substrate side.

45. A semiconductor substrate fabrication method comprising:

the step of forming an unporous layer on a porous

layer formed on a surface of a first substrate;

the step of adhering a first substrate side of a prospective structure and a second substrate prepared separately to sandwich said unporous layer between the first substrate side and said second substrate;

the removal step of removing said first substrate from the adhered structure to expose said porous layer on a second substrate side thereof; and

the etching step of etching said porous layer while the second substrate side on which said porous layer is exposed is completely dipped into an etching solution, and ultrasonic waves are supplied, thereby exposing a surface of the second substrate side,

the etching step swinging the second substrate side.

46. A semiconductor substrate fabrication method comprising:

the step of forming an unporous layer on a porous layer formed on a surface of a first substrate;

the step of adhering a first substrate side of a prospective structure and a second substrate prepared separately to sandwich said unporous layer between the first substrate side and said second substrate;

the removal step of removing said first substrate from the adhered structure to expose said porous layer on a second substrate side thereof; and

the etching step of etching said porous layer while

the second substrate side on which said porous layer is exposed is completely dipped into an etching solution, and ultrasonic waves are supplied, thereby exposing a surface of the second substrate side,

the etching step swinging the second substrate side to cross a plane of vibration of ultrasonic waves.

47. A semiconductor substrate fabrication method comprising:

the step of forming an unporous layer on a porous layer formed on a surface of a first substrate;

the step of adhering a first substrate side of a prospective structure and a second substrate prepared separately to sandwich said unporous layer between the first substrate side and said second substrate;

the removal step of removing said first substrate from the adhered structure to expose said porous layer on a second substrate side thereof; and

the etching step of etching said porous layer while the second substrate side on which said porous layer is exposed is completely dipped into an etching solution and supported substantially perpendicular to a plane of vibration of ultrasonic waves, and ultrasonic waves are supplied, thereby exposing a surface of the second substrate side,

the etching step swinging the second substrate side to cross the plane of vibration of ultrasonic waves.

48. A semiconductor substrate fabrication method comprising:

the step of forming an unporous layer on a porous layer formed on a surface of a first substrate;

the step of adhering a first substrate side of a prospective structure and a second substrate prepared separately to sandwich said unporous layer between the first substrate side and said second substrate;

the removal step of removing said first substrate from the adhered structure to expose said porous layer on a second substrate side thereof; and

the etching step of etching said porous layer while the second substrate side on which said porous layer is exposed is completely dipped into an etching solution and supported substantially parallel to a plane of vibration of ultrasonic waves, and ultrasonic waves are supplied, thereby exposing a surface of the second substrate side,

the etching step swinging the second substrate side to cross the plane of vibration of ultrasonic waves.

49. The apparatus according to claim 4, wherein swing support member are made of a material selected from the group consisting of a fluorine resin, vinyl chloride, polyethylene, polypropylene, polybutyleneterephthalate (PBT), and polyetheretherketone (PEEK).